Geuder®
Precision made in Germany

Manufacturer of Ophthalmic Surgical Instruments and Systems

GEUDER AG • Hertzstrasse 4 • 69126 Heidelberg • GERMANY

GEUDER AG
Hertzstrasse 4
69126 Heidelberg
GERMANY
phone: +49 6221 306-6
fax: +49 6221 303122
e-mail: info@geuder.de
www.geuder.de

To whom it may concern:

Your ref.	Date	Our ref.	Date
		ES	2011-03-04

Stainless Steels for Instruments

We hereby declare that our ophthalmic instruments are made of stainless and heat-resistant steels which are in conformance with the requirements of the DIN EN 10088 series, ISO 7153-1:2000 and DIN 58298:2010. The following materials are used:

Material No.	EN Standard	US (AISI/SAE)	GB (B.S.)
1.4021	X 20 Cr 13	420 A	420 S 37
1.4024	X 15 Cr 13	-	420 S 29
1.4031	X 39 Cr 13	304 or 420	420 S 45
1.4034	X 46 Cr 13	420C	-
1.4105	X 6 CrMoS 17	430F	-
1.4117	X 38 CrMoV 15	-	-
1.4301	X 5 CrNi 18-10	304 (V2A) / 304H	304 S 15
1.4305	X 8 CrNiS 18-19	303	303 S 22
1.4310	X 10 CrNi 18-8	301 and 302	301 S 21
1.4401	X 5 CrNiMo 17-22-2	316	316 S 13
1.4404	X 2 CrNiMo 17-22-2	316L (V4A)	316 S 11
1.4571	X 6 CrNiMoTi17-12-2	316Ti	320 S 18

GEUDER AG

GEUDER AG
Hertzstraße 4
Tel. (+49) 06221/3066
D-69126 Heidelberg

Stanek

Elisabeth Stanek
Regulatory Affairs Manager

Chart of Stainless Steels Commonly used in Geuder Product Groups*

	1.4021	1.4024	1.4031	1.4034	1.4105	1.4117	1.4301	1.4305	1.4310	1.4401	1.4404	1.4571
Clamps (Klemmen)	X	X										
Curettes, Spoons (Küretten, Löffel)	X			X					X			
Fixation Rings (Fixierringe)	X									X	X	
Forceps (Pinzetten)		X										
Foreign Body Instruments (Fremdkörperinstr.)				X								
Hooks (Haken)	X			X								
I/A-Instruments (Spül-/Sauginstrumente)							X			X	X	
Injectors (Injektoren)									X	X	X	
Knives (Lanzen, Messer)				X					X			
Lens Loops (Starschlingen)	X			X								
Localizers (Lokalisatoren)										X		
Manipulators incl. Peelers (Manipulatoren)				X					X	X	X	
Markers (Markierer)								X	X	X	X	
Measuring Instruments (Messinstrumente)	X								X			
Needle Holders (Nadelhalter)	X											
Probes (Sonden)	X								X	X	X	
Punches (Stanzen)	X			X							X	
Razor Blade Holders (Rasierklingenhalter)	X											
Scissors (Scheren)				X		X			X			
Screws (Schrauben)								X		X		
Spatulas (Spatel)	X			X					X	X	X	
Specula (Lidsperrer)	X						X			X	X	
Trephines (Trepanen)				X				X				

*Article-specific materials must be requested on an individual basis.

Geuder® Precision made in Germany

Geuder®
Precision made in Germany

Stainless Steel Chemical and Physical Properties

Chemical Composition (According to DIN EN 10088-1:2005)

Material	C %	Si %	Mn %	P ≤ %	S ≤ %	Cr %	Mo %	Ni %	Cu %
1.4021	0.16-0.25	≤ 1.00	≤ 1.50	0.040	0.015	12.0-14.0	- / -	- / -	- / -
1.4024	0.12-0.17	≤ 1.00	≤ 1.00	0.045	0.030	12.0-14.0	- / -	- / -	- / -
1.4031	0.36-0.42	≤ 1.00	≤ 1.00	0.040	0.015	12.5-14.5	- / -	- / -	- / -
1.4034	0.43-0.50	≤ 1.00	≤ 1.00	0.040	0.015	12.5-14.5	- / -	- / -	- / -
1.4105	≤ 0.08	≤ 1.50	≤ 1.50	0.040	0.15-0.35	16.0-18.0	0.20-0.60	- / -	- / -
1.4117	0.35-0.40	≤ 1.00	≤ 1.00	0.045	0.030	14.0.15.0	0.40-0.60	- / -	- / -
1.4301	≤ 0.07	≤ 1.00	≤ 2.00	0.045	0.015	17.5-19.5	- / -	8.0-10.5	- / -
1.4305	≤ 0.10	≤ 1.00	≤ 2.00	0.045	0.15-0.35	17.0-19.0	- / -	8.00-10.0	≤ 1.00
1.4310	0.05-0.15	≤ 2.00	≤ 2.00	0.045	0.015	16.0-19.0	≤ 0.80	6.00-9.50	- / -
1.4401	≤ 0.07	≤ 1.00	≤ 2.00	0.045	0.015	16.5-18.5	2.00-2.50	10.0-13.0	- / -
1.4404	≤ 0.03	≤ 1.00	≤ 2.00	0.045	0.015	16.5-18.5	2.00-2.50	10.0-13.0	- / -
1.4571	≤ 0.08	≤ 1.00	≤ 2.00	0.025	0.015	16.5-18.5	2.00-2.50	10.5-13.5	- / -

Geuder®
Precision made in Germany

Mechanical Properties at Room Temperature (According to DIN EN 10088-2:2005)

Material	State	Thickness ≤ mm	Hardness HB 30	0.2% Yield stress ≥ N/mm²	1% Yield stress ≥ N/mm²	Tensile strength N/mm²	Elongation after fracture ≥ %	Reduction of area ≥ %	Impact value (ISO-V) ≥ J
1.4021	annealed	- / -	≤ 230	- / -	- / -	≤ 760	- / -	- / -	- / -
1.4024	annealed	- / -	≤ 225	- / -	- / -	≤ 720	- / -	- / -	- / -
1.4031	annealed	- / -	≤ 245	- / -	- / -	≤ 800	- / -	- / -	- / -
1.4034	annealed	- / -	≤ 245	- / -	- / -	≤ 800	- / -	- / -	- / -
1.4105	annealed	100	≤ 200	250	- / -	430-630	20	- / -	- / -
1.4117	hardened	- / -	54 – 56 (HRC)	- / -	- / -	- / -	- / -	- / -	- /-
1.4301	annealed	160 / 250	≤ 215	190	225	500-700	45 / 35	60	100 / 60
1.4305	annealed	160	≤ 230	190	225	500-750	35	60	- / -
1.4310	annealed	40	≤ 230	195	230	500 - 750	40	50	- / -
1.4401	annealed	- / -	≤ 215	200	235	500 - 700	40 / 30	60	100 / 60
1.4404	annealed	160 / 250	≤ 215	200	235	500 - 700	40 / 30	60	100 / 60
1.4571	annealed	160 / 250	≤ 215	200	235	500 - 700	40 / 30	50	100 / 60

Geuder®
Precision made in Germany

Physical Properties (Stahlschlüssel 1992 and DIN EN 10088-1:2005)

Material	Density (20°C) kg/dm^3	Specific heat (20°C) J / g • K	Heat conduction (20°C) W / K • m	Electric resistance (20°C) Ω • mm^2/m	Modulus of elasticity (20°C) kN/ mm^2	Magnetizable
1.4021	7.7	0.46	30	0.60	215	yes
1.4024	7.7	0.46	30	0.60	216	yes
1.4031	7.7	0.46	30	0.55	215	yes
1.4034	7.7	0.46	30	0.55	215	yes
1.4105	7.7	0.46	25	0.70	220	yes
1.4117	7.7	0.46	30	0.55	221	yes
1.4301	7.9	0.50	15	0.73	200	no
1.4305	7.9	0.50	15	0.73	200	no
1.4310	7.9	0.50	15	0.73	200	no
1.4401	8.0	0.50	15	0.75	200	no
1.4404	8.0	0.50	15	0.75	200	no
1.4404	8.0	0.50	15	0.75	200	no
1.4571	8.0	0.50	15	0.75	200	no

Geuder®
Precision made in Germany

HRC Values measured by GEUDER AG* (According to DIN EN ISO 6508-1:2006)

Instruments	HRC (Hardening)	HRC (Tempering)
Clamps (Klemmen)	51-56	49-54
Curettes, Spoons (Küretten, Löffel)	53-57	49-53
Fixation Rings (Fixierringe)	51-53	49-51
Forceps (Pinzetten)	44-49	40-46
Foreign Body Instruments (Fremdkörperinstr.)	55-60	51-58
Hooks (Haken)	53-57	49-53
I/A-Instruments (Spül-/Sauginstrumente)	N.A.	N.A.
Injectors (Injektoren)	N.A.	N.A.
Knives (Lanzen, Messer)	55-60	51-58
Lens Loops (Starschlingen)	N.A.	N.A.
Localizers (Lokalisatoren)	53-57	49-53
Manipulators incl. Peelers (Manipulatoren)	51-56	49-54
Markers (Markierer)	51-53	49-51
Measuring Instruments (Messinstrumente)	51-53	49-51
Needle Holders (Nadelhalter)	N.A.	N.A.
Probes (Sonden)	52-58	49-55
Punches (Stanzen)	N.A.	N.A.
Razor Blade Holders (Rasierklingenhalter)	N.A.	N.A.
Scissors (Scheren)	51-56	49-54
Spatulas (Spatel)	53-57	49-53
Specula (Lidsperrer)	N.A.	N.A.
Trephines (Trepanen)	55-60	51-55

*These HRC values reflect general values for groups. HRC values for individual instruments may differ.